



Contribution ID: 550

Type: **Invited talk in the parallel session**

Causal fermion systems: Classical gravity and beyond

Monday, July 5, 2021 5:30 PM (20 minutes)

The theory of causal fermion systems is an approach to fundamental physics. It gives quantum mechanics, general relativity and quantum field theory as limiting cases and is therefore a candidate for a unified physical theory. The dynamics of causal fermion systems is described by a variational principle called the causal action principle (for more details see <https://causal-fermion-system.com>).

In the talk, I will outline how and in which sense the causal action principle gives rise to classical gravity. Moreover, I will explain in various examples how to go beyond classical gravity:

- The general definition of the total mass of a static causal fermion system
- A general connection between area change and matter flux
- Geometric structures giving a setting of Lorentzian quantum geometry

We conclude with an outlook on quantum gravity.

Primary author: FINSTER, Felix (Universität Regensburg)

Presenter: FINSTER, Felix (Universität Regensburg)

Session Classification: Mathematical Problems of Relativistic Physics: Classical and Quantum

Track Classification: Alternative Theories: Mathematical Problems of Relativistic Physics: Classical and Quantum